WHAT IS CLAIMED IS:

1. An object recognition apparatus for a vehicle, comprising:

a radar unit capable of emitting a transmission wave throughout a predetermined angular range in vertical and horizontal directions of said vehicle to receive a reflected wave from a reflecting object;

recognition means for recognizing said reflecting object on the basis of a result of the transmission and reception of said waves in said radar unit;

setting means for, on the basis of a result of transmission/reception of a wave relative to a predetermined target in said radar unit, setting an angular range of emission of a transmission wave in at least one of vertical and horizontal directions of said vehicle to an angular range smaller than said predetermined angular range so that, for recognition of said reflecting object, said radar unit emits said transmission wave in the smaller angular range set by said setting means.

2. The apparatus according to claim 1, wherein said predetermined target is a fixed object located at a predetermined distance and at a predetermined height with respect to said vehicle on which said radar unit is mounted.

3. The apparatus according to claim 2, wherein said radar unit is made to emit a plurality of transmission waves in the vertical and horizontal directions of said vehicle, and said setting means sets the smaller angular range so that the transmission wave having an angle at which the reflected wave from said predetermined target shows a maximum reception level is centered in the smaller angular range.

4. The apparatus according to claim 3, wherein a transmission-wave emission angle is set so that the transmission waves adjacent to each other in the vertical direction overlap partially in their boundary region.

5. The apparatus according to claim 3, wherein, when said setting means sets the smaller angular range, said radar unit emits the transmission wave at said target within an angular error margin of the mounting of said radar unit on said vehicle.

6. The apparatus according to claim 3, further comprising calculation means for calculating a central output axis angle of said radar unit on the basis of reception levels of the transmission waves emitted from upper and lower sides with respect to a transmission wave having an angle which provides a maximum reception level.

7. The apparatus according to claim 6, further comprising decision means for making a decision as to whether an output axis of said radar unit takes an upturn or a downturn when said central output axis angle is out of a reference angular range, and in accordance with a downturn or upturn decision in said decision means, said recognition means lowers the probability of said reflecting object being recognized as a vehicle, on the basis of the reflected wave of the transmission wave emitted from an angle on the lower or upper side with respect to the center of the smaller angular range.

8. The apparatus according to claim 6, wherein, when said central output axis angle calculated by said calculation means is a downturned angle with respect to a reference angle, in a case in which detected is only the reflected wave of the transmission wave emitted from the lower side with respect to the transmission wave having said angle which provides the maximum reception level, said recognition means recognizes that said reflecting object is a non-vehicle.

9. The apparatus according to claim 7, further comprising:

estimation means for estimating a central output axis angle of a transmission wave in the vertical direction of said radar unit on the basis of a reflected wave stemming from a reflector of a preceding vehicle satisfying a predetermined condition; and

correction means for correcting said central output axis angle calculated by said calculation means when said central output axis angle estimated by said estimation means is shifted from said central output axis angle calculated by said calculation means.

10. The apparatus according to claim 9, wherein, when said preceding vehicle exists in a distance range prescribed by predetermined upper and lower limits, said estimation means estimates said central output axis angle.

11. The apparatus according to claim 9, wherein, when a lateral width of said preceding vehicle falls within a predetermined range, said estimation means estimates said central output axis angle.

12. An inter-vehicle distance control unit comprising:

measurement means for emitting a transmission wave around one's vehicle to detect a distance up to a reflecting object and an emission angle of said transmission wave on the basis of a result of detection of a reflected wave of said transmission wave;

calculation means for calculating a relative position and a relative speed of said reflecting object with respect to said one's vehicle on the basis of said distance and said emission angle detected by said measurement means;

object state decision means for, on the basis of said relative speed calculated by said calculation means, making a decision as to whether said reflecting object is in a moving state or in a stopping state;

one's-lane probability calculating means for changing a probability of the existence of said reflecting object on the same lane as that of said one's vehicle, to be allocated to said reflecting object, on the basis of said relative position calculated by said calculation means in accordance with the moving/stopping state of said reflecting object determined by said object state decision means; and

inter-vehicle distance control means for selecting a preceding vehicle for inter-vehicle distance control on the basis of the probability allocated by said one's-lane probability calculating means to control an inter-vehicle distance relative to the selected preceding vehicle.

13. The unit according to claim 12, wherein said one's-lane probability calculating means includes:

a stopping object probability map indicative of a distribution of probability of the existence on the same lane as that of said one's vehicle, associated with said relative position of said reflecting object which takes a stopping state as a decision result in said object state decision means;

a moving object probability map indicative of a distribution of probability of the existence on the same lane as that of said one's vehicle, associated with said relative position of said reflecting object which takes a moving state as a decision result in said object state decision means; and

probability detecting means for obtaining a probability of the existence of said reflecting object on the same lane as that of said one's vehicle by applying said relative position, calculated by said calculation means, to said probability map for the state of said reflecting object to which said object state decision means makes a decision.

14. The unit according to claim 13, wherein said stopping object probability map and said moving object probability map prescribes said relative position of said reflecting object on the basis of a distance in a lateral direction of said one's

vehicle and a distance in a forward direction of said one's vehicle, and a probability allocation range of said stopping object probability map, in which the probability of the existence on the same lane is allocated, is set to be smaller than a probability allocation range of said moving object probability map in which the probability of the existence on the same lane is allocated.

15. The unit according to claim 13, wherein said stopping object probability map has said probability distribution of a length in a lateral direction corresponding to a width of a lane on which said one's vehicle travels, and said probability distribution is made laterally narrower toward a center in said lateral direction as a distance from said one's vehicle in its forward direction becomes longer after exceeding a predetermined distance, and shows a lower probability as said distance in said forward direction of said one's vehicle becomes longer and a distance from the center of said one's vehicle in said lateral direction becomes longer.

16. The unit according to claim 13, wherein said moving object probability map is set so that said probability distribution is made in a range of a length obtained by adding a lateral length corresponding to widths of right- and left-side lanes relative to said one's vehicle to a lateral length corresponding to a width of a lane on which said one's vehicle travels, and said probability distribution spreads laterally from a center in said lateral direction as a distance from said one's vehicle in its forward direction becomes longer, and the probability becomes lower with the spreading from the center of said one's vehicle in said lateral direction.

17. The unit according to claim 13, wherein said one's-lane probability calculating means includes probability calculating means for calculating a new

probability through averaging processing on the basis of the probability calculated the last time and the probability obtained by said probability detecting means.

18. The unit according to claim 17, wherein, in said averaging processing, said probability calculating means changes weighting of the probability calculated the last time and the probability obtained by said probability detecting means in accordance with the distance to said reflecting object detected by said measurement means.

19. The unit according to claim 12, wherein, in selecting a preceding vehicle for inter-vehicle distance control, said inter-vehicle distance control means selects a reflecting object having the highest probability, obtained by said one's-lane probability calculating means, as a preceding vehicle for inter-vehicle distance control.